1.

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Screenshot inside Tuffix



3. Screenshot of execution

```
sh -c make -s
disk_state still works: passed, score 1/1
sorted_disks still works: passed, score 1/1
disk_state::is_initialized: passed, score 3/3
disk_state::is_sorted: passed, score 3/3
alternate, n=4: passed, score 1/1
alternate, other values: passed, score 1/1
lawnmower, n=4: passed, score 1/1
lawnmower, n=3: passed, score 1/1
lawnmower, other values: passed, score 1/1
TOTAL SCORE = 14 / 14

> ./main
Hello World!
> .
```

4. Step count and efficiency

Lawnmowers Algorithm Pseudocode:

```
a[] // a random given array
n = a.size()
for j = 0 to n/2 do: // make sure it runs n/2 times n/2+1
times
  for i = 1 to n-1 do: // move from left to right n-1
times
      if (a[i] == black && a[i+1] != black): // check for
swappable elements 3 tu
          swap;
// S.C. = 3(n^2-n)/2 + 3n-3
   for j = n-1 down to 1 do: // move from right to left n-1
times
      if (a[j] == white \&\& a[j-1] != white): // check for
swappable elements 3 tu
           swap;
                 S.C. = 2n-2 so final step count 3n^2-9n+12/2.
Time complexity is O(n^2)
```

Alternate Algorithm Pseudocode:

```
a[] // a random given array
n = a.size()
```

```
bool sorted
while(!sorted) do:
  for i = 1 to n-1 do: // move from left to right
n-1 times
      else if (a[i] == black && a[i+1] != black): // check for
swappable elements 3 tu
          swap;
//
                         S.C.: 3n-3
  for i = 2 to n-2 do: // check the secondleft to secondright
disc n-3 times
      else if (a[i] == black && a[i+1] != black): // check for
swappable elements 3 tu
          swap;
```

S.C.: 3n-9 so $9n^2-36n+27$.

//

Time complexity is $O(n^2)$

5. Time Complexity

We have concluded that both pseudocode algorithms are $O(n^2)$ based on the leading terms.

	Lawn Mower.
	3n2-9n+12
	2
	+
	Bult: 202 00 1
	By LT: 302-9112
	n ²
	L'140P1ta1: 3n2-9n+12 6n-9 3(2n-3)
	$\frac{2}{2n^2} = \frac{3n^2 - 9n + 12}{9n + 12} = \frac{6n - 9}{9n - 12} = \frac{3(2n - 3)}{9n}$
	2n ² 4n 4n
	= 3(\pi - \pi)
	$= \frac{3}{4} = \boxed{\alpha}$
	74-14
	48
	Alternate
	$9n^2 - 36n + 27 \in O(n^2)$
	911 - 3411 + 21 E O(11)
-	1- 0.02 2/10/12
<u> </u>	ytt: 9n2-36n+27
	Λ2
	2 26 10 14 27
	$\frac{1}{2}$ + $\frac{1}{2}$ + $\frac{1}{2}$ + $\frac{1}{2}$ = $\frac{1}{2}$ = $\frac{1}{2}$
	18h-36 + 100 4h
	4h
	= <u>18</u> -> <u>9</u>
	4 2
	4 2